



Specialist Group
Statistics and
Economics



IWA Workshop
Current Status and Financial Strategy of Water
Utilities in the World
March 19th , 2015

Water Utility Management
in Japan

Satoshi Takizawa
Professor, Graduate School of Engineering
The University of Tokyo

Geography of Japan

4 big island and many small island

Length: 3,000km

Land Area: 380,000km²

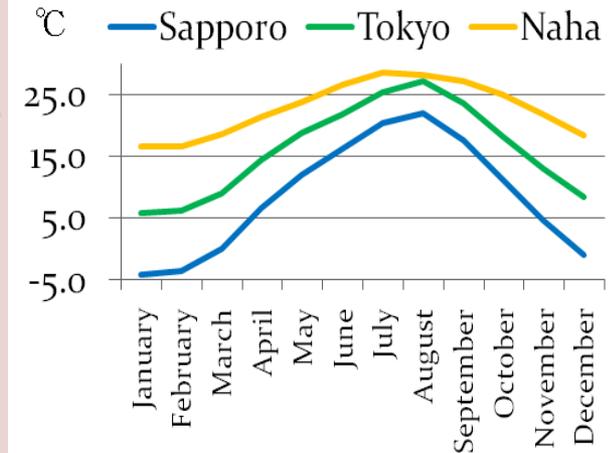
Population: 127,440 thousand

■ **Sapporo**
Latitude 43

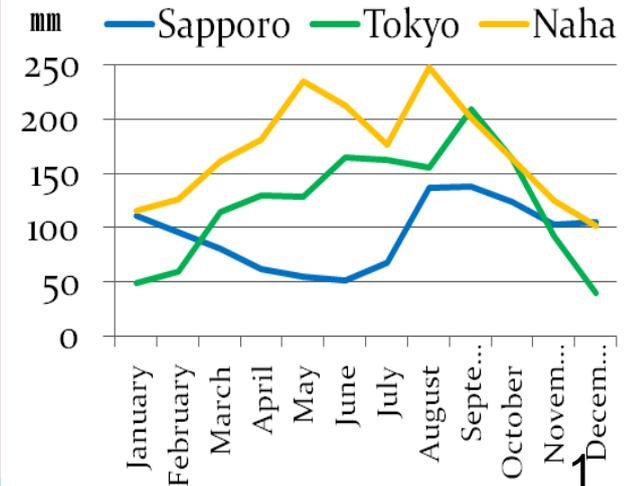
■ **Tokyo**
Latitude 35

■ **Naha**
Latitude 35

Temperature



Precipitation

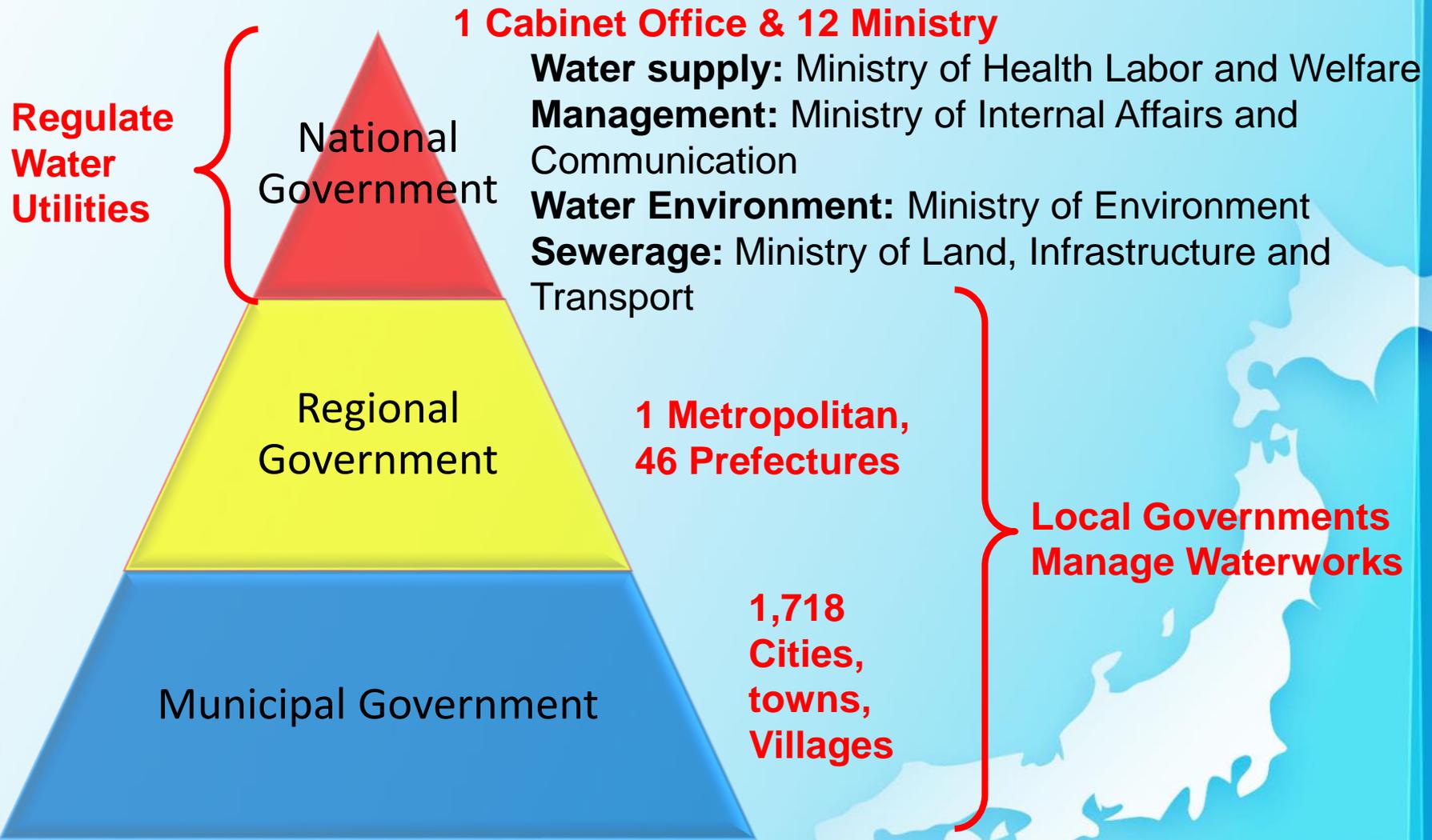


Waterworks in Japan

The First Modern Waterworks: est. in 1887
Water Supply Volume per Capita: 326 L/d

	unit	2010	2011	2012
Total Population	Thousand capita	128,000	127,713	127,440
Water Supply Population	thousand capita	124,817	124,657	124,466
Coverage Ratio		97.5%	97.6%	97.7%
Daily Maximum Water Supply Volume	thousand m ³	48,149	47,240	46,383
Daily Average Water Supply Volume	thousand m ³	41,482	40,838	40,611

Structure of National and Municipal Governments



Number of Water Utilities

	Year	2010	2011	2012
	Organization			
Water Supply	Prefecture	5	5	5
	City	843	833	821
	Town	500	497	494
	Village	37	37	37
	Special District Authority	49	48	48
	Private	9	9	9
	Subtotal	1,443	1,429	1,414
Bulk Water Supply	Prefecture	44	42	42
	City, Town, Village	4	4	4
	Special District Authority	50	49	49
	Subtotal	98	95	95
Small Scale Water supply Systems (Supply Population =<5,000)	Public	5,874	5,672	5,494
	Others	813	783	763
	Subtotal	6,687	6,455	6,257
Total		16,178	15,983	15,866

Annual Water Abstraction

(Water supply & Bulk water supply)

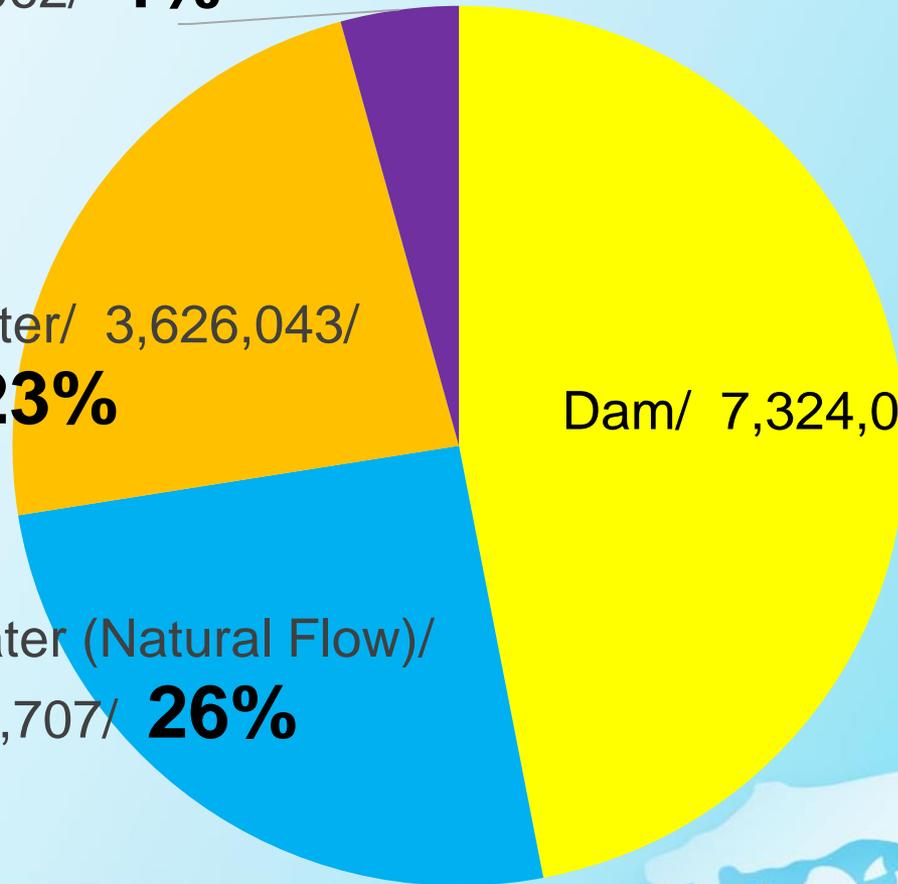
(1,000m³)

Others/ 666,062/ **4%**

Ground Water/ 3,626,043/
23%

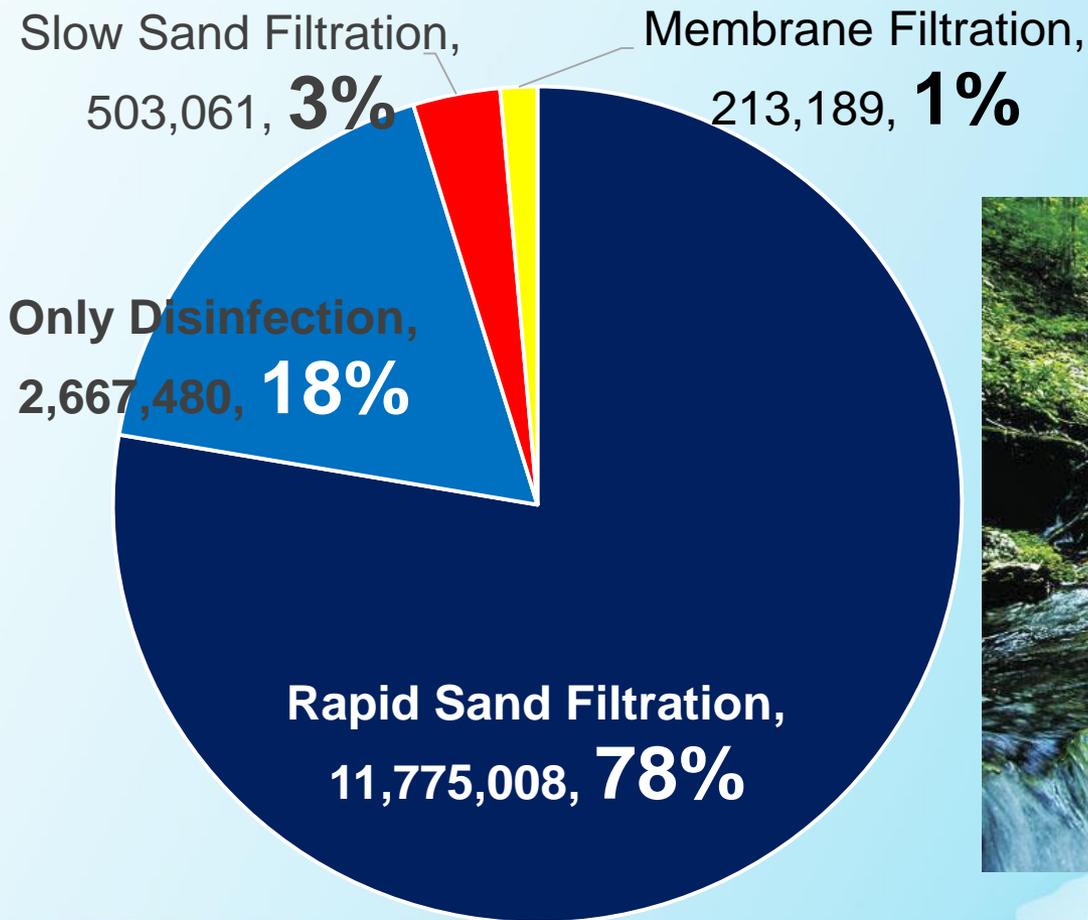
Surface Water (Natural Flow)/
3,976,707/ **26%**

Dam/ 7,324,065/ **47%**



Annual Purification Volume

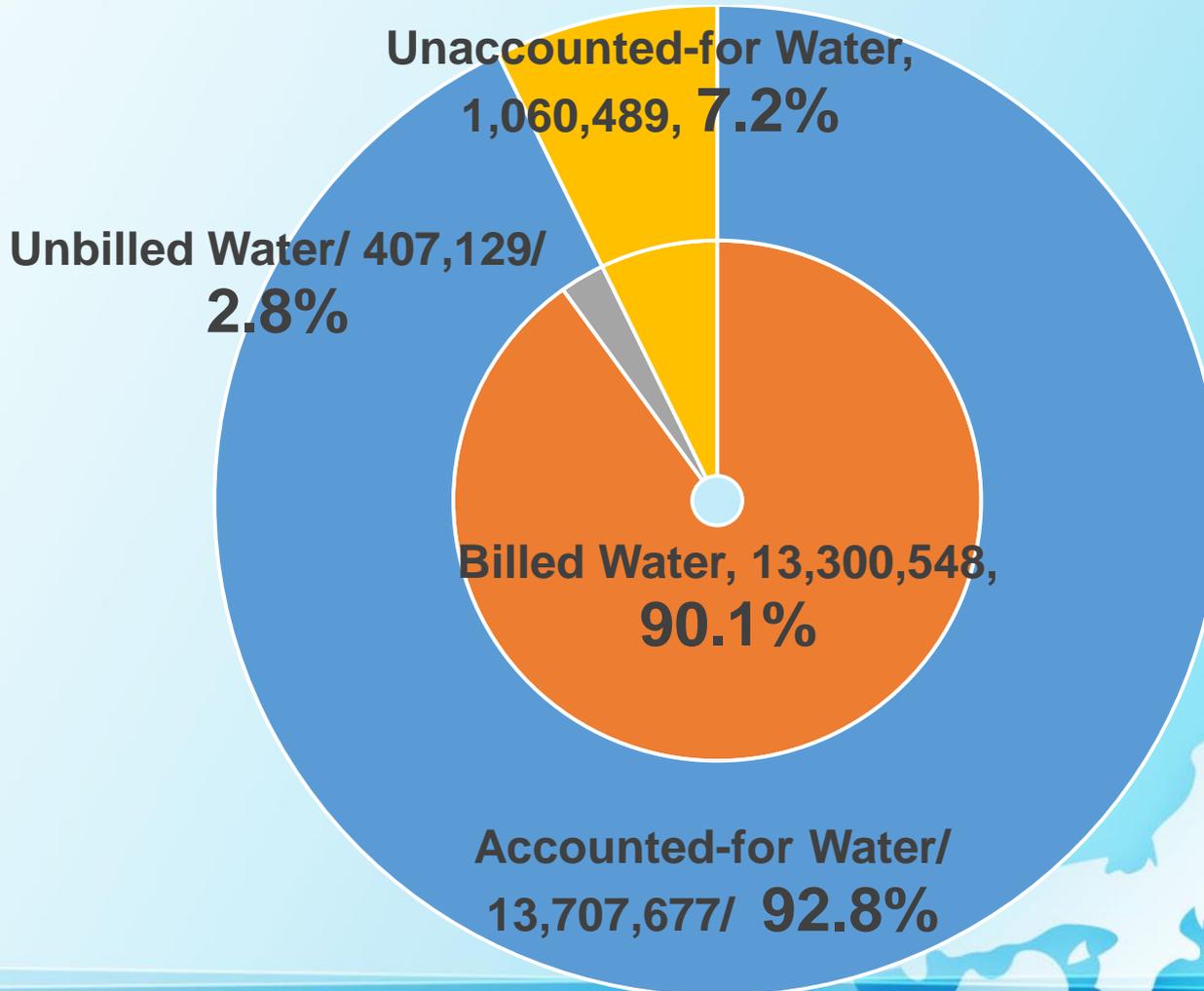
(Water supply & Bulk water supply in 2012) (1,000m³)



Annual Water Supply Volume

(Water supply & Bulk water supply in 2012)

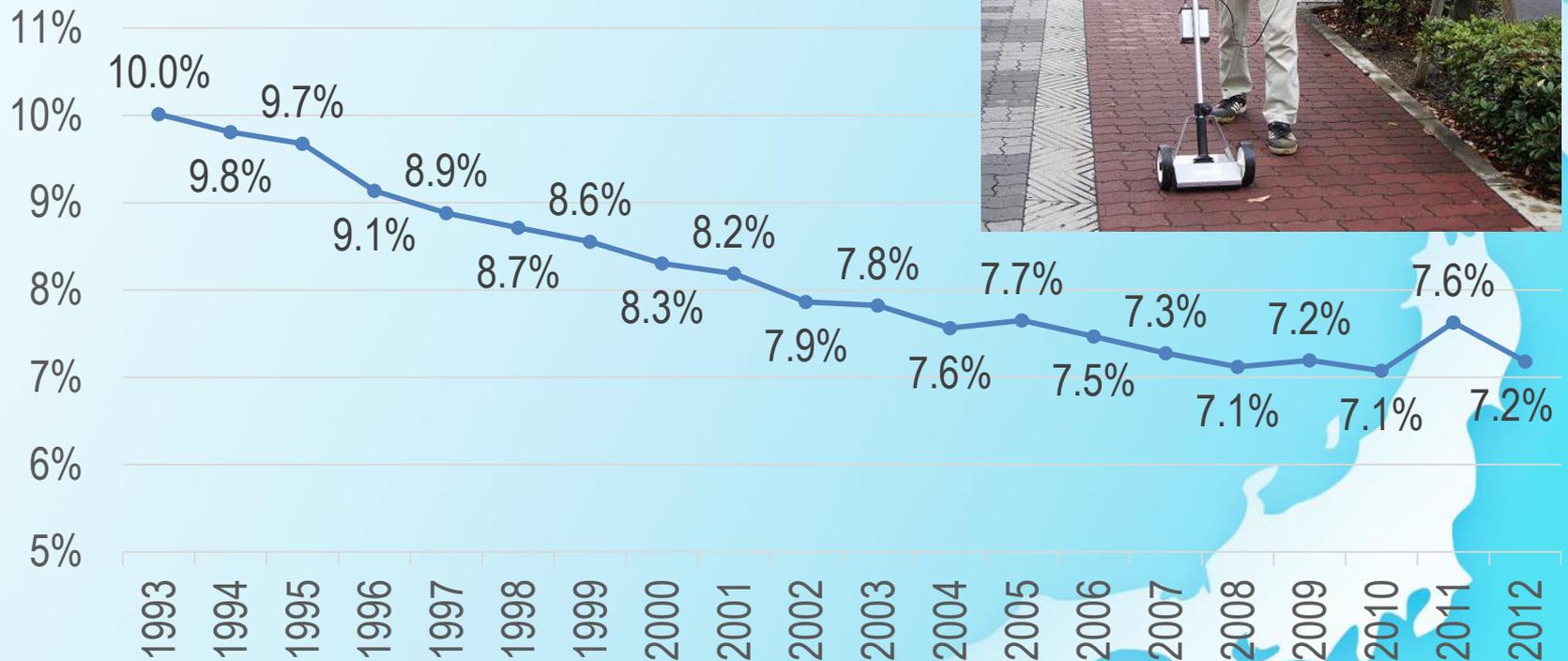
(1,000m³)



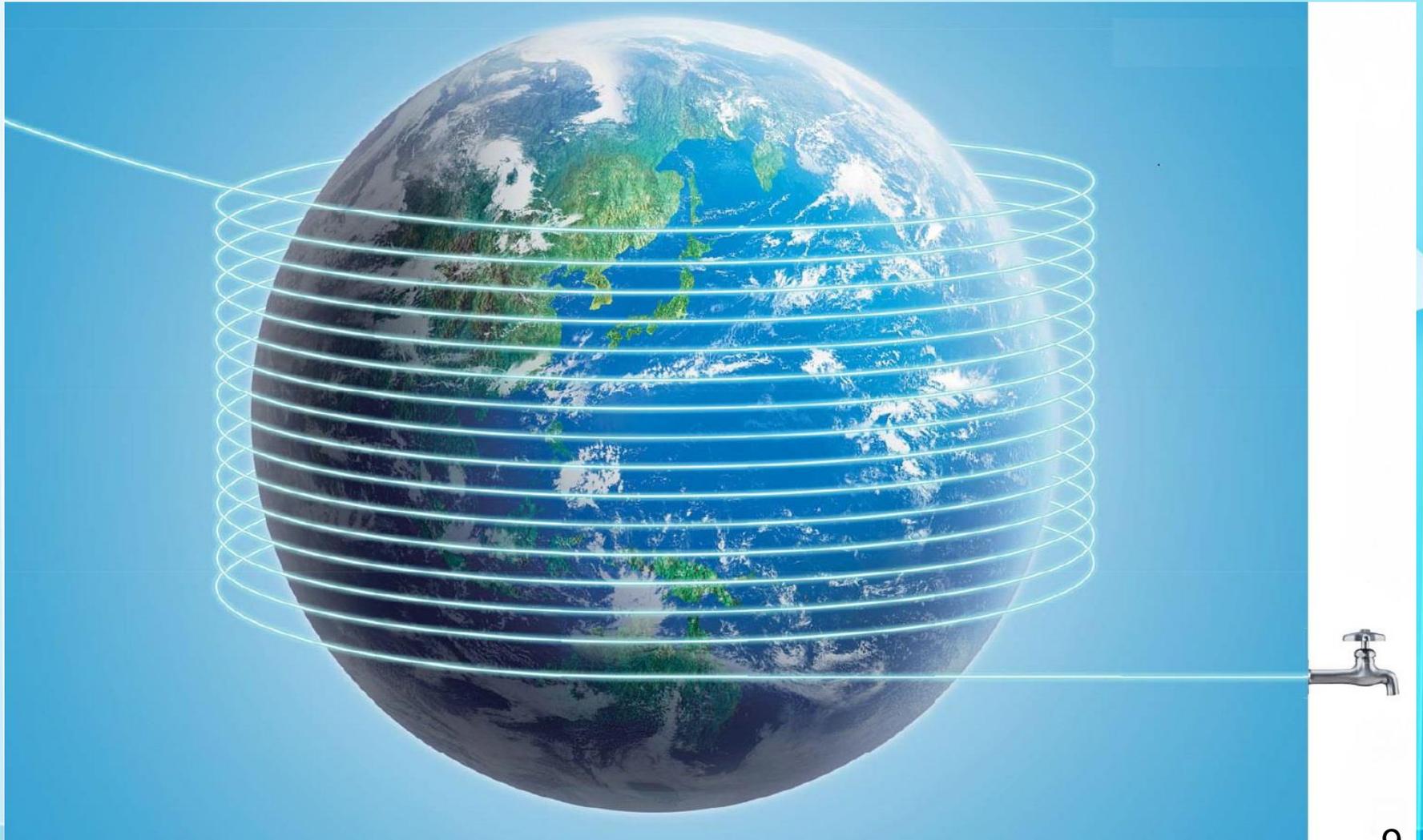
Reduction of Water Leakage

Water Leakage Ratio: 7.2% (JPN Ave.)
Tokyo Metro.: 2.0% (2012)

(Water supply & Bulk water supply)

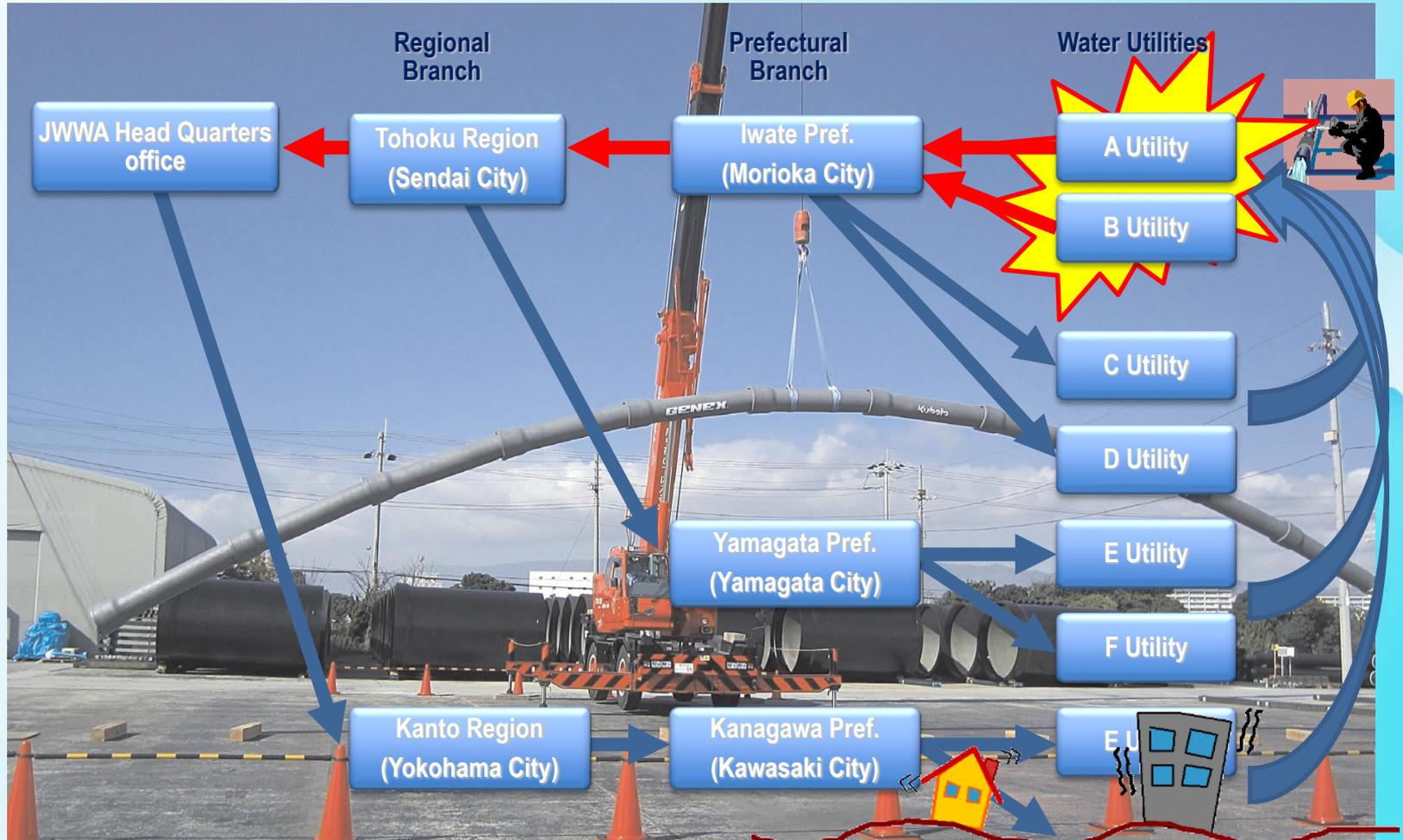


Pipeline length



Earthquake

Anti-seismic pipe, and collaboration network

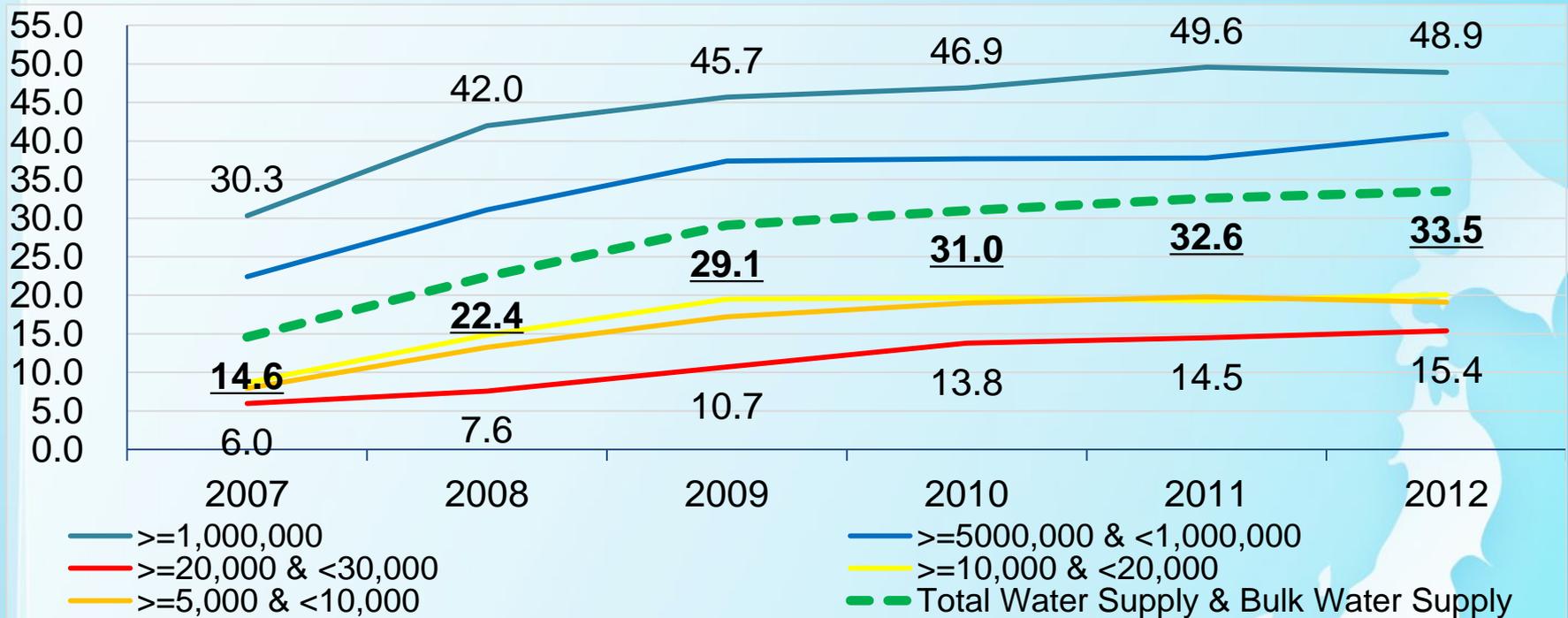


Challenges - Resilience

Ratio of Earthquake-resistant Pipeline

(Water supply & Bulk water supply)

(%)



Ratio of Earthquake-resistant Facilities	2010	2011	2012
Main Pipeline (Water Conveyance, Transmission, Distribution Main Pipe)	31.0	32.6	33.5
Water Treatment Facilities	18.7	19.7	21.4
Distribution Reservoirs	38.0	41.3	44.5

Waterworks in Japan

Financial Conditions

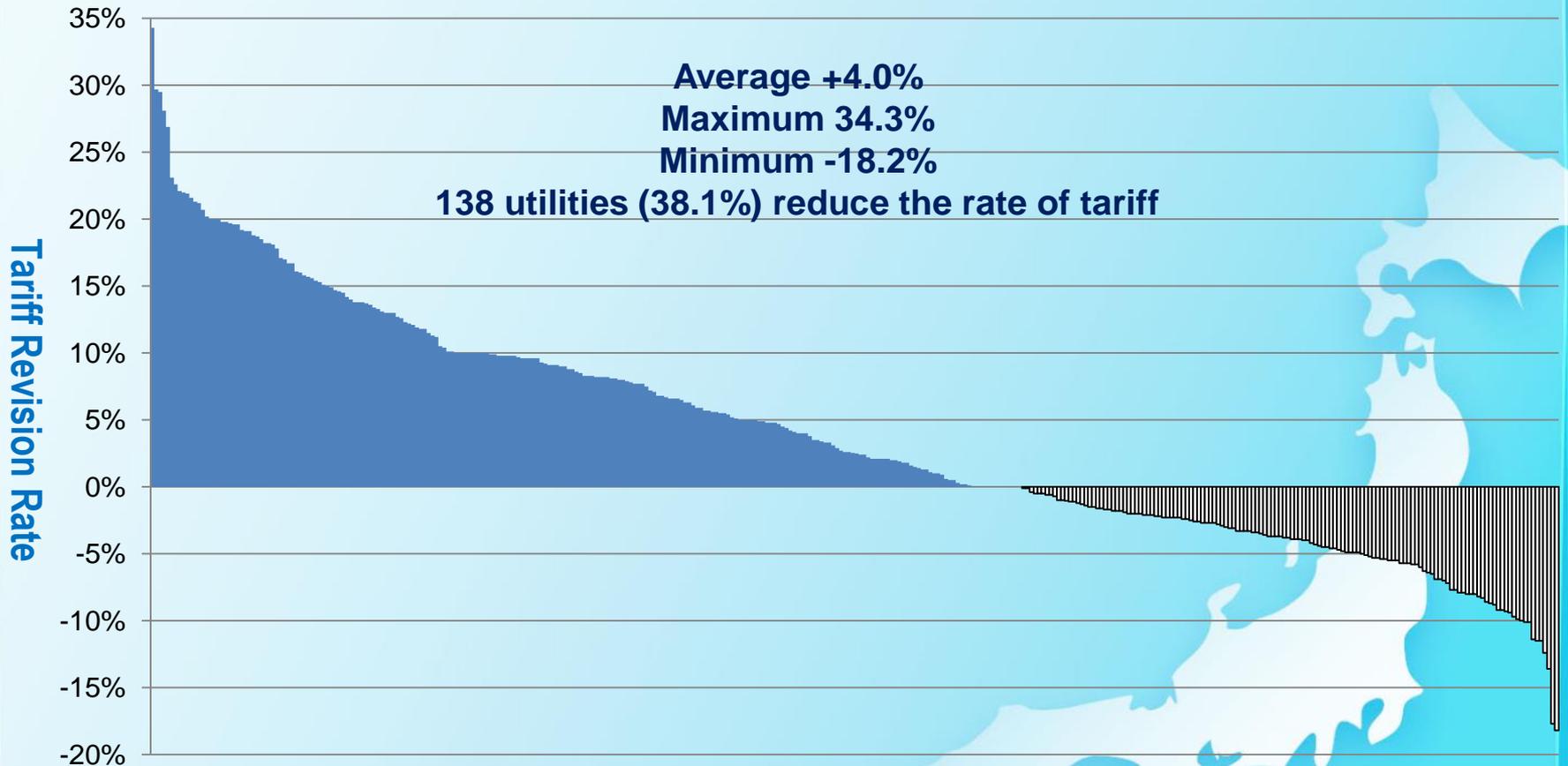
- **Self-accounting System based on Corporate Accounting Principles**
- **The Water Tariff are approved in the assembly of local governments.**
- **No Regulation body for Water Tariff**

Challenges - Sustainability

Securing Appropriate Tariff Level

Current State of Tariff Revision

(Arrange the revision rate of 362 utilities in high order, 2011-2014)



Challenges - Sustainability

Renewal of Aged Facilities



Rust of Aged Pipe

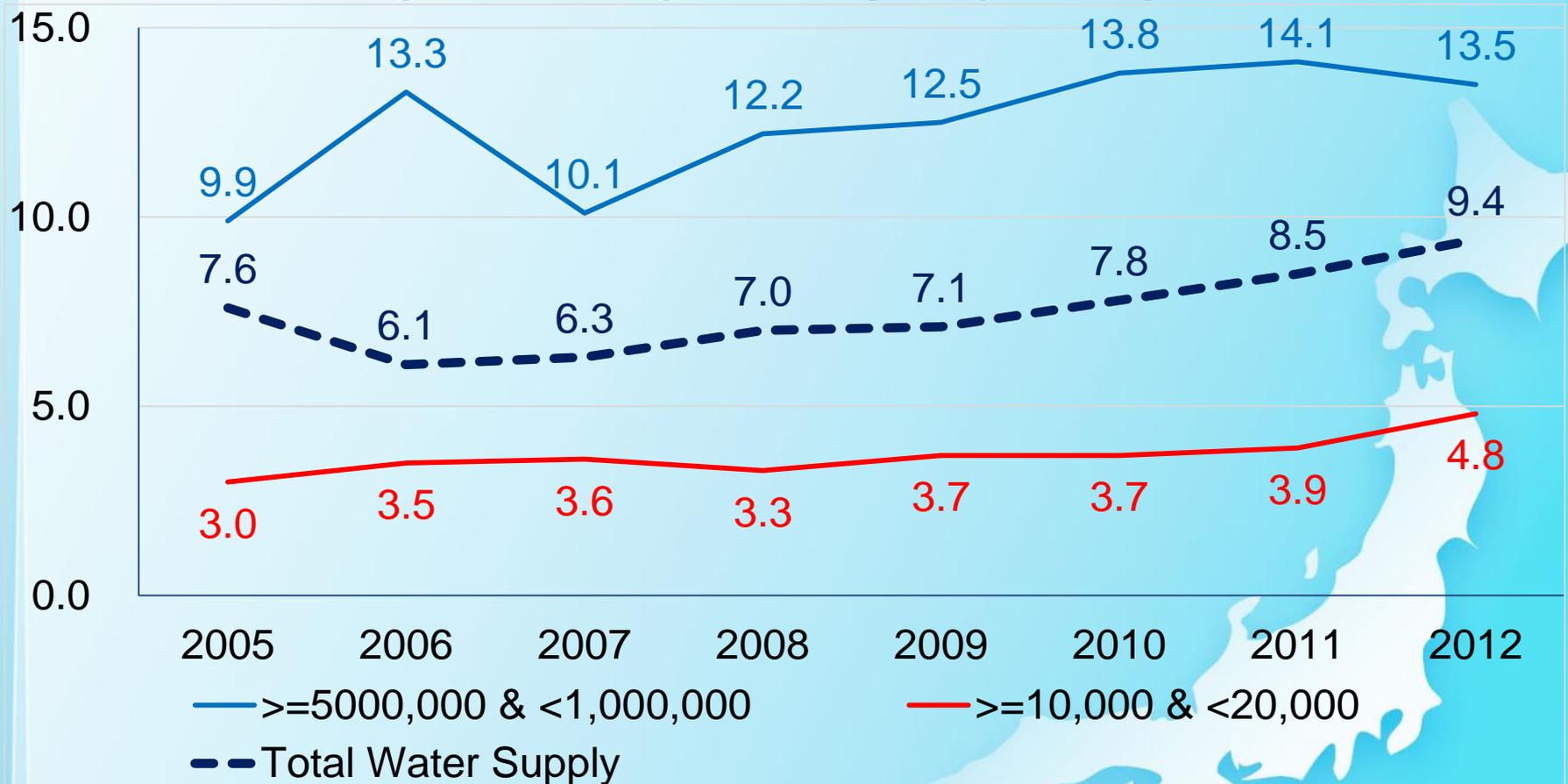


Water Leakage from Aged Pipe

Challenges - Sustainability

Renewal of Aged Facilities

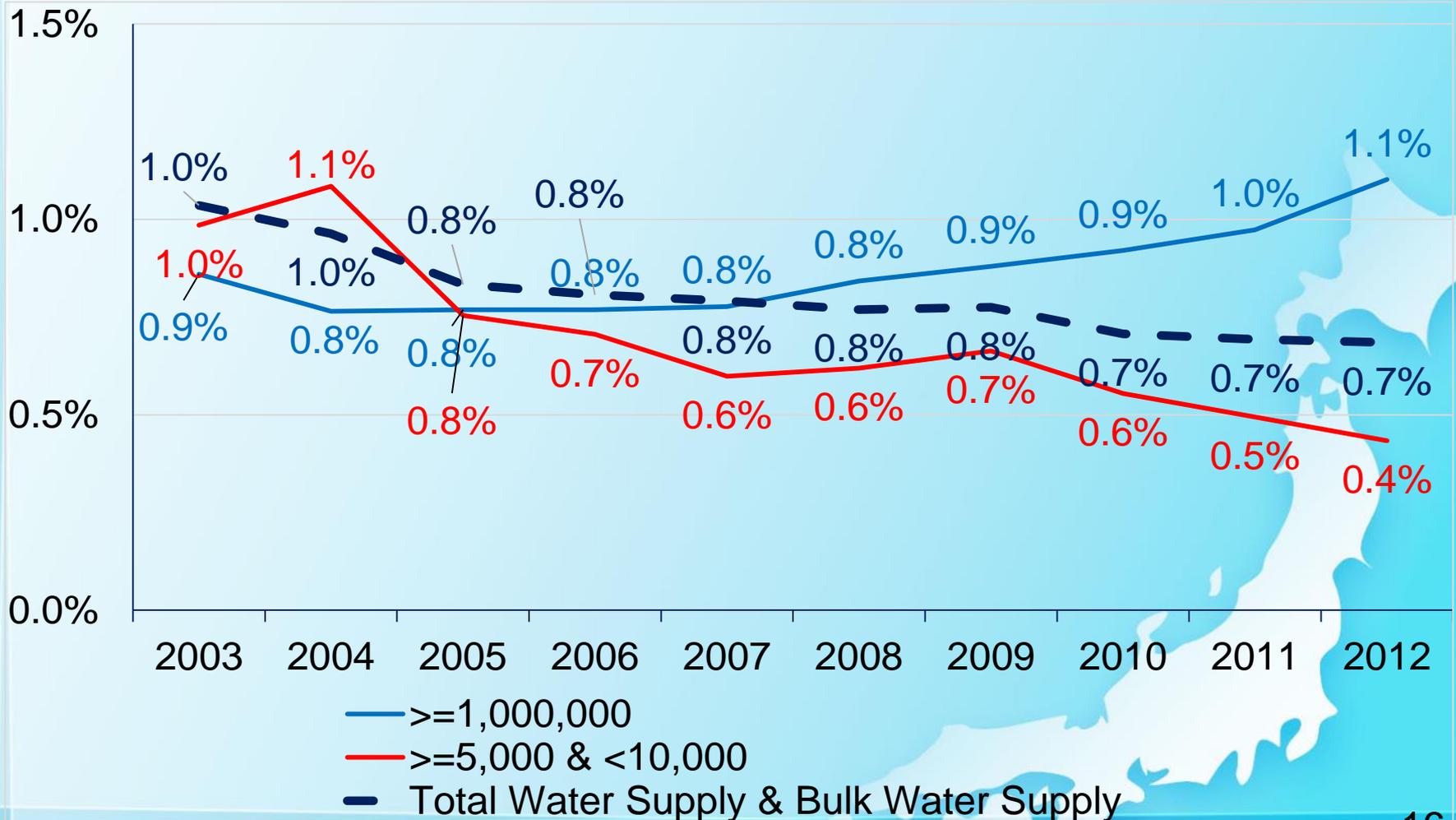
Ratio (%) of Aged Pipes exceed Depreciation Period Designated by Law (40 years)



Challenges - Sustainability

Renewal of Aged Facilities

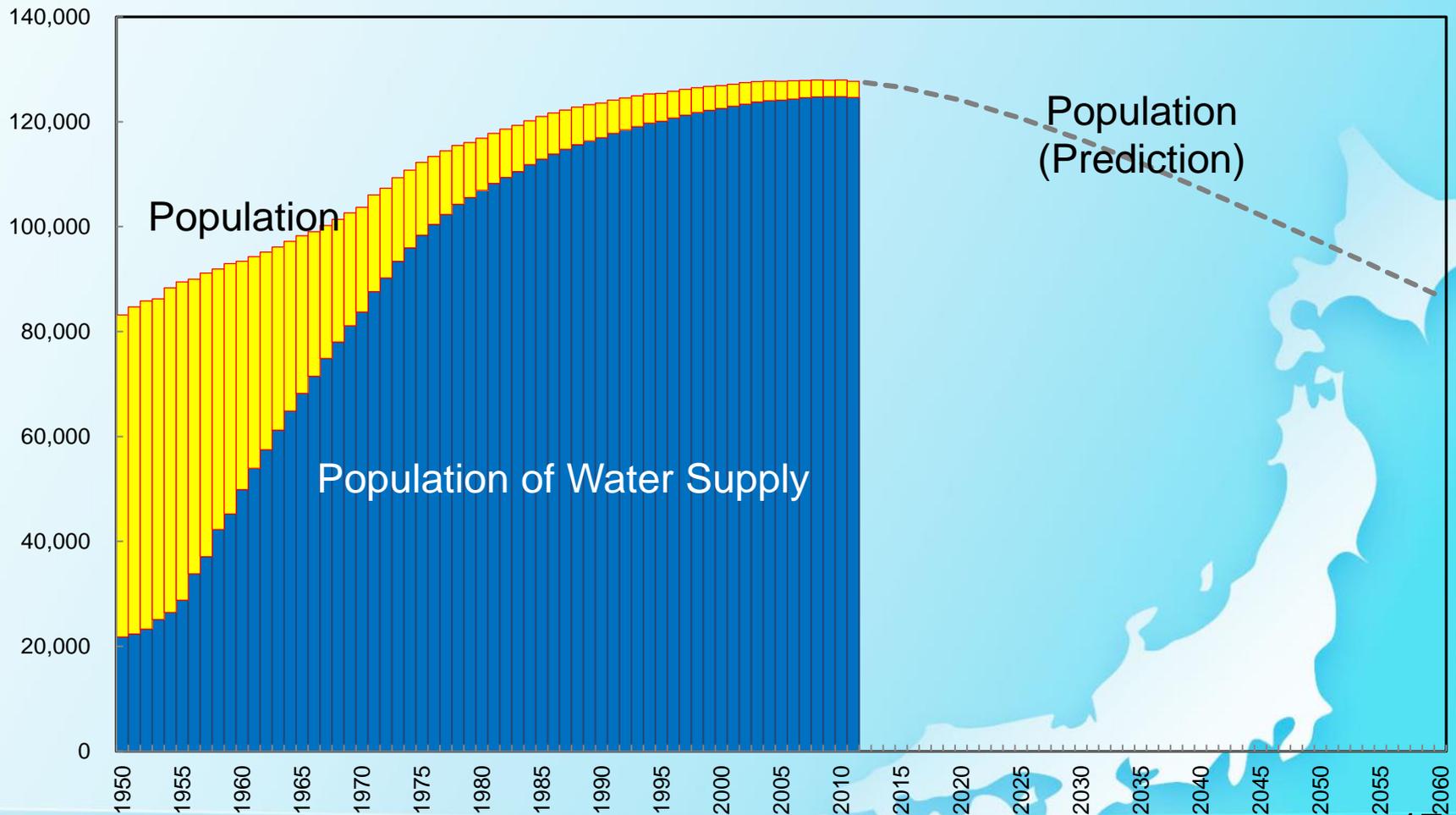
Ratio (%) of Replaced Pipes



Challenges - Sustainability

Revenue on Water Supply is Decreasing

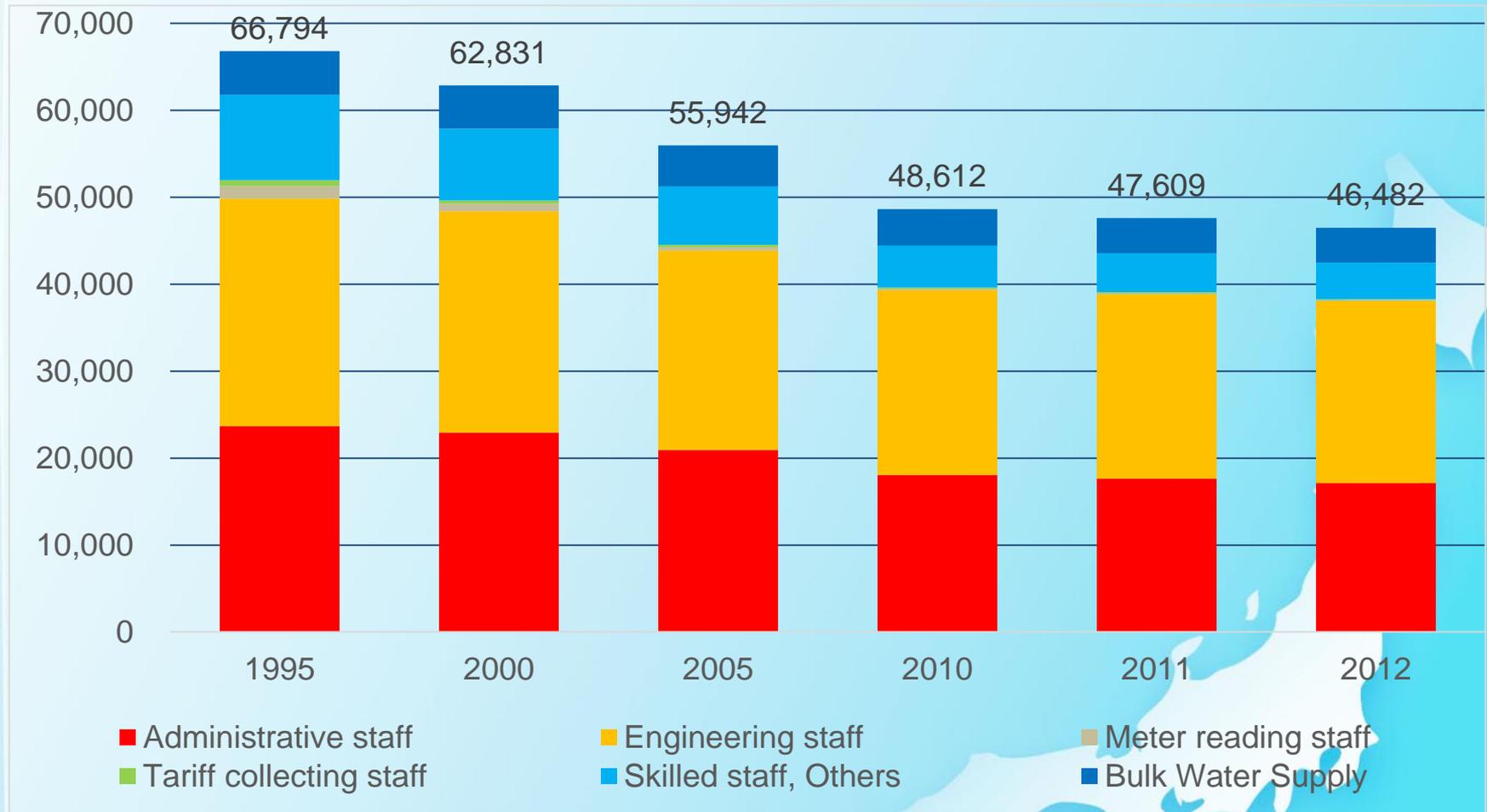
Future Prediction of Population



Challenges - Sustainability

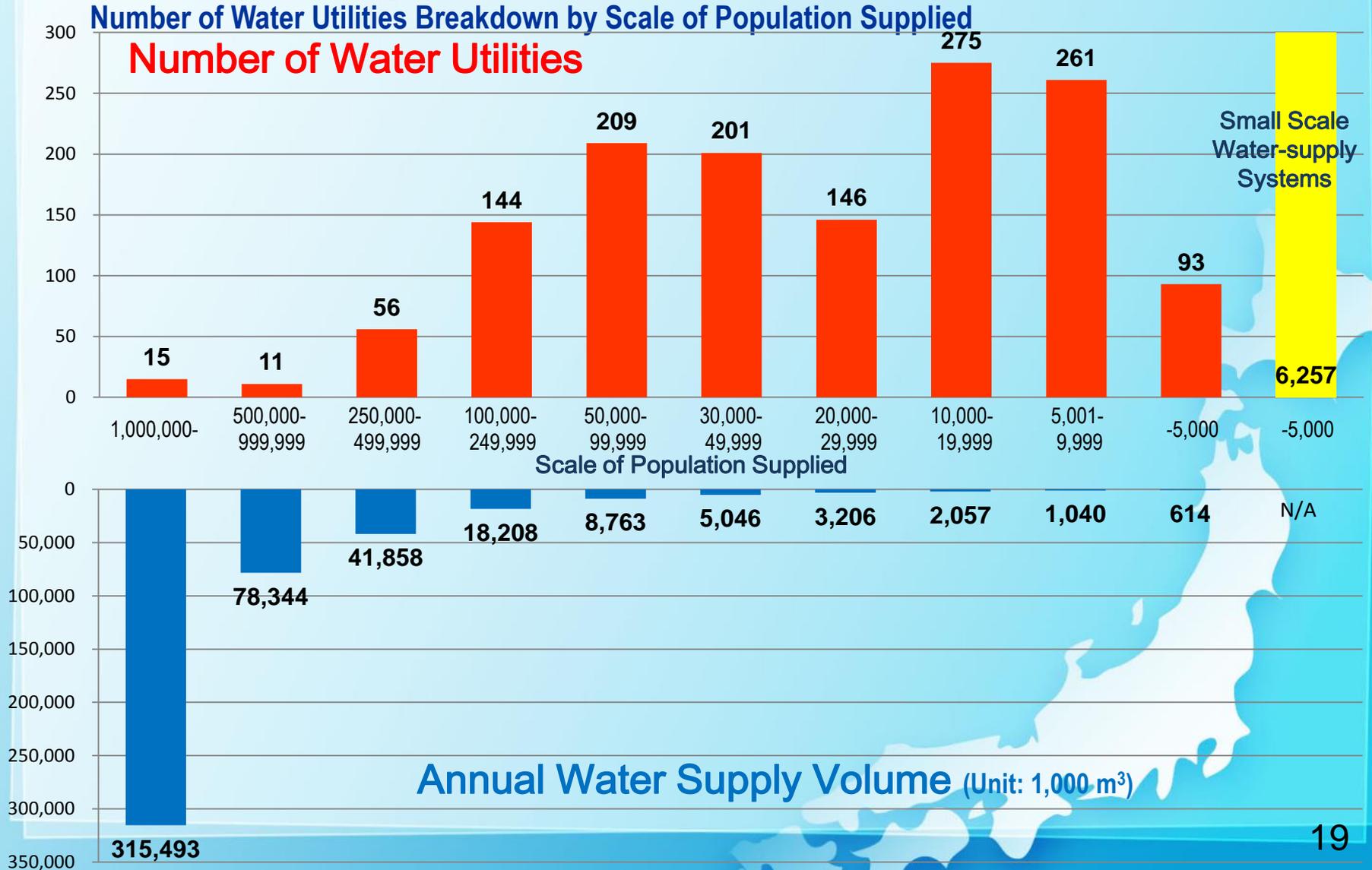
Succession of Know-how, Technique

Transition of the number of Personnel



Challenges - Sustainability

Vulnerability of Small Scale Water Utilities



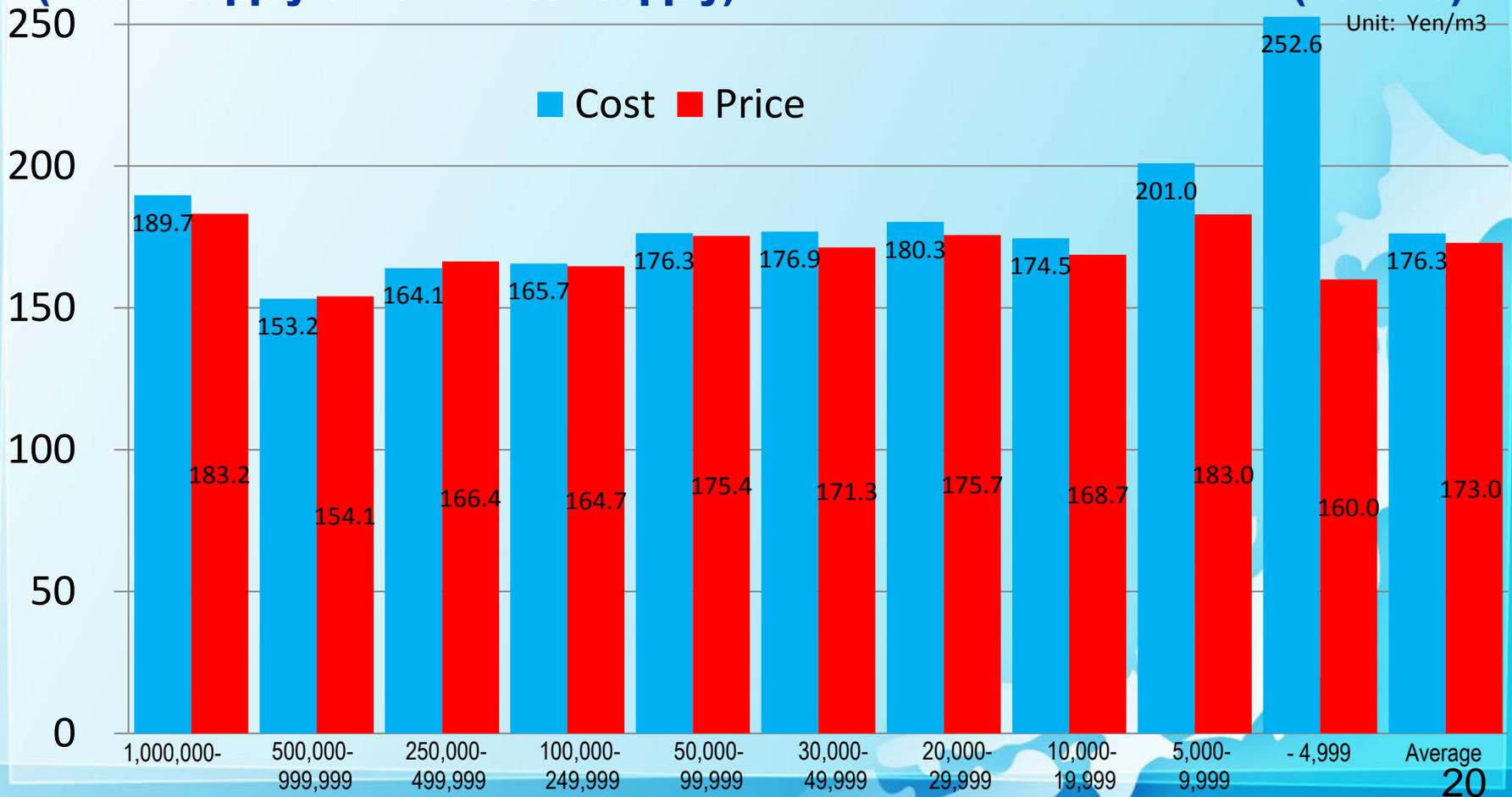
Challenges - Sustainability

Vulnerability of Small Scale Water Utilities

Supply cost & Unit price by Population Scale

(Water supply & Bulk water supply)

(Yen/m³)

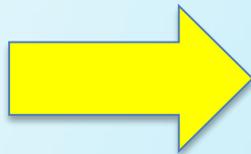


Towards the Problem Solution Self-Analysis

Practical Use of Statistics on Water Supply in Japan

**All 1,509 Utilities cooperate on this statistic
Number of Items**

- **Facilities & Management: 3,800 items
Water supply, Management, Personnel,
Risk management, etc.**
- **Water Quality: 3,000 items**



**Comparison with same scale utilities
Comparison with Japanese average, etc.**

Towards the Problem Solution Self-Analysis

Practical Use of Japanese Performance Indicator (JWWA Standards Q100: Guidelines for the management and assessment of a drinking water supply service)

Number of Items: 137

91 items are able to calculate

based on Statistics on Water supply in Japan

➤ **Reliability**

Ex) Self owned resources ratio: 77.05%

➤ **Stability**

Ex) Drinking water storage volume per population supplied: 180.63L

➤ **Sustainability**

Ex) Ratio of Current income to Current expense: 108.92%

➤ **Environment**

Ex) Electric power consumption per 1m³: 373.40 kWh/m³

Towards the Problem Solution

Asset Management

Current status of Asset Management:

Large-scale Water Supply & Bulk Water Supply

51.6%

Small-scale Water Supply (<50,000 PE)

12.5%

Support Tool to promote introduction of Asset Management, especially, for the Small Scale Water Utilities (Ministry of Health, Labour and Welfare)

Towards the Problem Solution

Consolidation of Water Utilities (Up-scaling)

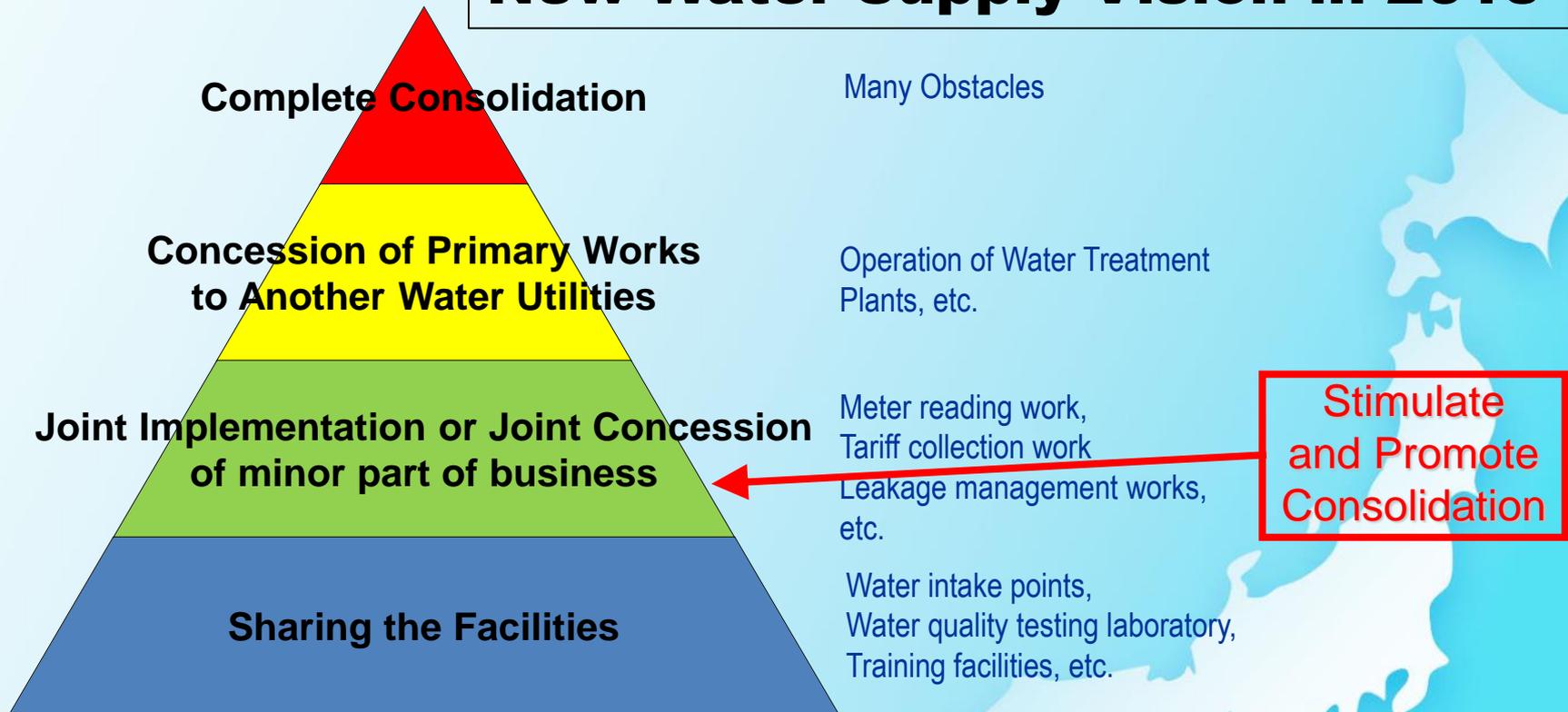
Reasons Why Consolidation Does Not Progress in Japan

- **No Enforcement from National Government**
- **Absence of Leader Utilities**
- **Gaps in Water Tariff Levels, Financial Conditions, Facility Levels, and Maintenance Levels**
- **Personnel Reduction by Consolidation**
- **The most of Small Utilities are Exhausted to promote consolidation, etc.**

Towards the Problem Solution

Various types of Consolidation of Water Utilities

New Water Supply Vision in 2013



Towards the Problem Solution

Public Private Partnerships (PPP)

Reasons Why PPP Does Not Progress in Japan

- **Absence of Regulatory Organization**
- **Water Utilities worried about**
 - **Losing skilled staff**
 - **Declining of service quality**
 - **Emergency response**
 - **Uncertainty in the cost reduction**

Towards the Problem Solution

AIM of the IWA workshop

- **Sharing information and statistical data between water utilities in different countries to offer an opportunity to re-think the current practice of water utility management.**

Thank you for your attention!